REMARKS

Status of Claims:

New claims 20-21 are added. Thus, claims 1-21 are present for examination.

Claim Rejections:

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laughlin (U.S. Patent Number 5,553,175) in view of Manchester et al. ("IP Over Sonet") (hereinafter Manchester), and further in view of Bright et al. (U.S. Patent Number 5,694,473) (hereinafter Bright).

With respect to claims 1-19, as amended, the rejection is respectfully traversed.

Independent claim 1, as amended, recites a scramble control method for a switching system, said switching system comprising:

> a switch having input ports and output ports, said switch operative for switchably interconnecting said input ports with said output ports;
>
> a plurality of input interfaces each connected to a corresponding input port of the switch, each of the input interfaces including a scrambler, <u>each scrambler having a pseudorandom pattern generator</u>, wherein each of the input interfaces inputs data to sequentially output frames including scrambled data to the corresponding input port of the switch; and
>
> a plurality of output interfaces each connected to a corresponding output port of the switch, each of the output interfaces including a descrambler, <u>each descrambler having a pseudorandom pattern generator</u>, wherein each of the output interfaces inputs frames including scrambled data from the corresponding output port of the switch to output frames of original data, and wherein <u>each of the pseudorandom pattern generators of the scramblers and the descramblers generates a same pseudorandom pattern when initialized with a same input value</u>,
>
> said scramble control method comprising the steps of:
>
> "resetting the scramblers simultaneously to <u>initialize the pseudorandom pattern generators</u> of the scramblers <u>**with the same input value**</u>, so as to <u>synchronize the scramblers</u>;

resetting the descramblers simultaneously to initialize the pseudorandom pattern generators of the descramblers **with the same input value**, so as to synchronize the descramblers and to establish synchronization between the scramblers and the descramblers; and

continuously maintaining synchronization between the scramblers and the descramblers **when the switch performs a switching operation**." (Emphasis Added).

A scramble control method including the above-quoted features has at least the advantages that: (i) **scramblers** of input interfaces that are connected to input ports of a switch are reset simultaneously to initialize pseudorandom pattern generators of the scramblers with **a same input value**, so as to synchronize the scramblers; (ii) **descramblers** of output interfaces that are connected to output ports of the switch are reset simultaneously to initialize pseudorandom pattern generators of the descramblers with **the same input value**, so as to synchronize the descramblers and to establish synchronization between the scramblers and the descramblers; and (iii) **synchronization** between the scramblers and the descramblers is **continuously maintained when the switch performs a switching operation**. Also, each of the pseudorandom pattern generators of the scramblers and the descramblers generates a same pseudorandom pattern when initialized with the same input value. (Substitute Specification; page 9, lines 13-17; page 20, lines 9-16; page 24, lines 1-5; page 25, lines 7-11).

Neither Laughlin, Manchester, nor Bright, alone or in combination, disclose or suggest a scramble control method including the above-quoted features in which synchronization between scramblers and descramblers connected to a switch is **continuously maintained when the switch performs a switching operation**.

The Examiner recognizes that Laughlin fails to disclose scramblers at the inputs of a switch and descramblers at the outputs of the switch. The Examiner then points to the self-synchronizing scrambler of Manchester and states that, "[i]t would have been obvious to the ordinary person skilled in the art at the time of invention to employ the teachings of Manchester to the optical switch of Laughlin by placing the self-synchronizing scramblers of Manchester at the inputs of the switch and by placing the self-synchronizing descramblers at the outputs of the switch." The Examiner further points to Bright as teaching that, "in order

to solve the loss of data while a self synchronizing descrambler synchronizes with the scrambler, when a scrambler and descramble[r] begin communicating, initialization data should be sent from the scrambler to the descrambler prior to the message data in order to synchronize without losing any message data".

However, even if the scramblers and descramblers of Manchester were employed with the switch of Laughlin and were initialized with initialization data as disclosed in Bright, the resulting device would **not** allow for **continuously maintaining synchronization** between the scramblers and the descramblers **when the switch performs a switching operation**. Instead, in the device resulting from the combination, once the values in the 43-bit shift registers of the scramblers and descramblers would be initialized with the initialization data as disclosed in Bright, the values in the 43-bit shift registers would change for each scrambler based on transmitted data and would change for each descrambler based on received data. (Manchester; FIG. 4). The values in the 43-bit shift registers of the scramblers and the descramblers of Manchester would depend on the previously transmitted or received 43 bits once the scramblers begin to transmit actual data and the descramblers receive the data. (Manchester; FIG. 4).

Then, if the switch of Laughlin performs a switching operation, and a scrambler of Manchester begins transmitting data to a descrambler to which it was not previously transmitting data, then the value in the 43-bit shift register of the scrambler would be **different** from the value in the 43-bit shift register of the descrambler. (Manchester; FIG. 4). As a result, such a scrambler and descrambler would **not continuously maintain synchronization** when the switching operation occurs. (Manchester; FIG. 4). The initialization data from Bright would have **already been shifted out** of the 43-bit shift registers of Manchester when the scramblers started transmitting data and the descramblers started receiving data, so the initialization data from Bright would **not** help in **continuously maintaining** synchronization.

In applicant's specification, applicant explains why the scrambler of Manchester **cannot** be applied directly to an optical switching system. (Substitute Specification; page 7, line 25 to page 9, line 7). Applicant describes the system of Manchester and then states:

"However, this system cannot be applied directly to an optical switching system." (Substitute Specification; page 8, lines 14-15) (Emphasis Added). Applicant explains that the synchronizing system of Manchester is devised for a **one-to-one** transmission device. (Substitute Specification; page 9, lines 4-7). Furthermore, applicant explains that the scrambler in Manchester is a self-synchronizing scrambler in which the internal state of the scrambler **varies** with **bit strings of the past**. (Substitute Specification; page 8, lines 15-18) (see also Manchester; page 139).

The system of Manchester works in a **one-to-one** configuration between **one** scrambler and **one** descrambler because both the scrambler and the descrambler can maintain synchronization based on bit strings of the past. However, as applicant explains, in an optical switching system, a transmission source of a frame received by an output interface **varies every time the optical switch performs switching**. (Substitute Specification; page 8, lines 18-20). As a result, synchronization between a scrambler and a descrambler is **lost** when switching is performed, because a **different** scrambler may be transmitting data to the descrambler after switching is performed, but the new different scrambler would **not** be synchronized with the descrambler because the new different scrambler would **not** know the **bit strings of the past**. (Substitute Specification; page 8, lines 21-22).

Indeed, applicant expressly states that, "[t]his is a problem peculiar to a **switching system**, and this problem **cannot** be solved by synchronizing systems devised for a **one-to-one** transmission device including the above-mentioned system devised by Manchester et al." (Substitute Specification; page 9, lines 4-7) (Emphasis Added).

Therefore, independent claim 1, as amended, is neither disclosed nor suggested by the Laughlin, Manchester, and Bright references and, hence, is believed to be allowable. The Patent Office has not made out a *prima facie* case of obviousness under 35 U.S.C. 103.

Independent claim 11 recites a scramble control method for a switching system, said switching system comprising:

> a switch having input ports and output ports, said switch operative for switchably interconnecting said input ports with said output ports;

a plurality of input interfaces each connected to a corresponding input port of the switch, each of the input interfaces including a scrambler, each scrambler having a pseudorandom pattern generator, wherein each of the input interfaces inputs data to sequentially output frames including scrambled data to the corresponding input port of the switch; and

a plurality of output interfaces each connected to a corresponding output port of the switch, each of the output interfaces including a descrambler, each descrambler having a pseudorandom pattern generator, wherein each of the output interfaces inputs frames including scrambled data from the corresponding output port of the switch to output frames of original data, and wherein each of the pseudorandom pattern generators of the scramblers and the descramblers generates a same pseudorandom pattern when initialized with a same input value,

said scramble control method comprising the steps of:

"at each of the scramblers,

generating a scrambler state indicating a value of a pseudorandom pattern generated by the pseudorandom pattern generator of the scrambler **in frame timing**;

assembling a frame including the scrambler state; and

transferring the frame including the scrambler state to the switch; and

at each of the descramblers,

receiving a frame including a scrambler state that is the scrambler state of a corresponding scrambler that assembled the frame; and

resetting the pseudorandom pattern generator of the descrambler to initialize the pseudorandom pattern generator of the descrambler with the value of the pseudorandom pattern indicated by the scrambler state, wherein the descrambler can be **synchronized** with the corresponding scrambler **after the switch performs a switching operation**." (Emphasis Added).

A scramble control method including the above-quoted features has at least the advantages that: (i) a scrambler state of each scrambler is generated **in frame timing**; (ii) **a frame** is assembled including the scrambler state; and (iii) pseudorandom pattern generators of each descrambler are reset to initialize the pseudorandom pattern generator of the descrambler with the value of the pseudorandom pattern indicated by the scrambler state,

wherein the descrambler can be **synchronized** with the corresponding scrambler **after the switch performs a switching operation**.

Neither Laughlin, Manchester, nor Bright, alone or in combination, disclose or suggest a scramble control method including the above-quoted features in which a scrambler state of each scrambler is generated **in frame timing** and **a frame** is assembled including the scrambler state, and wherein a descrambler can be **synchronized** with a corresponding scrambler **after a switch performs a switching operation**. The Examiner recognizes that Laughlin does **not** disclose scramblers and descramblers. Also, as discussed above, the scramblers and descramblers of Manchester **are not** synchronized after a switch performs a switching operation. The Examiner points to Bright, FIG. 1 and Col. 5, paragraph 2 as disclosing, "generating a scrambler state indicating a value of a pseudo-random pattern generated by the pseudorandom pattern generator of the scrambler **in frame timing**". (Emphasis Added).

However, the message indicator (MI) in the system of Bright is **not** generated **in frame timing**, but is transmitted once at the beginning of an encrypted **message**, where the message may be of **varying lengths** of X blocks. (Bright; FIG. 1; column 5, paragraph 2). Since a **message** in the system of Bright may be of **varying lengths**, if the system of Bright is combined with the systems of Laughlin and Manchester, a switching operation may occur by a switch in the **middle** of the transmission of a **message**, and then data of the message would be **lost**, because another message indicator would **not** be transmitted until the beginning of the **next message**.

Therefore, independent claim 11 is neither disclosed nor suggested by the Laughlin, Manchester, and Bright references and, hence, is believed to be allowable. The Patent Office has not made out a *prima facie* case of obviousness under 35 U.S.C. 103.

Independent claim 16, as amended, recites a switching system with similar features as features of a scramble control method of independent claim 1. Therefore, independent claim 16 is believed to be allowable for at least the same reasons that independent claim 1 is believed to be allowable.

Independent claim 18, as amended, recites a switching system with similar features as features of a scramble control method of independent claim 1. Therefore, independent claim 18 is believed to be allowable for at least the same reasons that independent claim 1 is believed to be allowable.

Independent claim 19 recites a switching system with similar features as features of a scramble control method of independent claim 11. Therefore, independent claim 19 is believed to be allowable for at least the same reasons that independent claim 11 is believed to be allowable.

The dependent claims are deemed allowable for at least the same reasons indicated above with regard to the independent claims from which they depend.

Conclusion:

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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